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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/669,479	09/24/2003	Steven G. Goebel	GP-303584	3973

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EXAMINER

HODGE, ROBERT W

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 10/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/669,479

Applicant(s)

GOEBEL ET AL.

Examiner

Robert Hodge

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 13-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-42 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/24/03</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments in the Appeal Brief, filed 8/21/06, with respect to the rejection(s) of claim(s) 13-22, 24, 28, 31, 33-42 under 35 U.S.C. 102(e) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of U.S. Patent No. 6,544,681 and 6,974,648.

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

### ***Claim Objections***

Claim 31 is objected to because of the following informalities: The recitation of PEM-type is improper and should first be defined before abbreviating within the claim. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 35, 36, 38, 39 and 42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The recitation of "land-to-land contact" in claims 35, 36 and 42 is indefinite because the lands do not and cannot make contact with one another as described in the earlier claims and in applicants' disclosure. There must be a membrane electrode assembly (MEA) disposed between the two flow field plates in order for the fuel cell to actually function as it should, therefore the lands of the two flow field plates cannot make any sort of contact with one another. For purposes of examining the Examiner construes that the "land-to-land contact" must include the MEA and said "contact" would be with the MEA and not the adjacent land.

The recitation of "in phase" and "out of phase" in claims 38 and 39 respectively is indefinite. Applicants have not provided any drawings that clearly show what is meant by wiggles having "in phase" or "out of phase" alignment nor is there any clear definition found in applicants' disclosure. The Examiner will further clarify in the Prior Art rejection how the terms "in phase" and "out of phase" are construed with respect to the Prior Art.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 13-15, 17, 19, 21, 28, 31 and 41 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,544,681 hereinafter McLean.

McLean teaches a proton exchange membrane (PEM) type fuel cell system comprising a membrane electrode assembly (MEA) defining anode and cathodes sides, having a first flow field plate for the cathode side defined by first channels and lands, a second flow field plate for the anode defined by second channels and lands with the MEA interposed between the first and second flow field plates, wherein the pitch of the first flow field plate is less than a pitch of the second flow field plate and said pitch defined by the second flow field plate is approximately twice as large as that defined by the first flow field plate, wherein a substantial number, majority and substantially all of the second lands have a cross sectional width wider than that of a substantial number, majority and substantially all of the first lands. McLean further teaches that the channels are either predominately straight or serpentine in orientation (abstract, figure 3, column 1, line 14 – column 2, line 36, column 3, line 60 – column 4, line 57, column 6, line 50 – column 8, line 42). The Examiner notes that figure 3 is only one of many bipolar plates that are provided within the fuel cell stack and therefore since channels 34 are for Hydrogen and 36 are for Oxygen a MEA would be present on both sides of the plate and subsequent plates would be stacked respectively against the MEAs thereby providing multiple plates as required by the instant claims.

Claims 13-22, 24, 26-28, 31 and 32 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. 6,974,648 hereinafter Goebel

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Goebel teaches a proton exchange membrane (PEM) type fuel cell system provided in a vehicle as the replacement for an internal combustion engine comprising a membrane electrode assembly (MEA) defining anode and cathodes sides, having a first flow field plate for the cathode side defined by first channels and lands, a second flow field plate for the anode defined by second channels and lands with the MEA interposed between the first and second flow field plates, wherein the pitch of the first flow field plate is less than a pitch of the second flow field plate and said pitch defined by the second flow field plate is approximately twice as large as that defined by the first flow field plate, wherein a substantial number, majority and substantially all of the second lands have a cross sectional width wider than that of a substantial number, majority and substantially all of the first lands, wherein a substantial number, majority and substantially all of the first channels define a cross section width approximately equal to the cross section width of a substantial number, majority and substantially all of the second channels, wherein a cross sectional width of the second lands is about 3 times wider than a cross sectional width of the first lands, wherein the thickness of the flow

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field plate is less than 1 mm and the channels are predominately straight (figure 5, column 1, lines 12-23 and column 4, line 9 – column 6, line 67).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 16, 18, 20, 22-25, 29, 30 and 32-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over McLean in view of U.S. Pre-Grant Publication No. 2002/004158 hereinafter Suzuki.

McLean teaches everything in the above 102 rejection.

McLean does not explicitly teach that the cross sectional width of the first channel is approximately equal to that of the second, or any specific dimensions found in the above listed claims or that further structure comprises structure defining a vehicle

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powered by the fuel cell or how the lands are oriented by angles and how the lands will contact on the surface of the MEA on adjacent sides.

Suzuki teaches a proton exchange membrane fuel cell for an automobile comprising membrane electrode assemblies which have two field flow plates having a plurality of channels wherein a substantial number, a majority and substantially all of the channel widths are approximately equal wherein the channels are designed to be varied in shape and pattern, where the channels can be different sizes, and cross sectional areas that have the same specific dimensions as those claimed in the present application, as well as orienting lands in parallel planes at an angle from 0 to 90 degrees such that a land contact on both sides of the MEA is between 20% and 50% and the pitch of the channels can be varied (figures 3, 4 and 5 and paragraphs [0002], [0023]-[0026], [0056]-[0059], [0063], [0066]-[0070], [0078]-[0079] and [0084]).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to include the features of the Suzuki reference in the McLean reference in order to provide a fuel cell that would be further optimized by reducing the size of the flow field plate and reduce the amount of material required to manufacture the plate, thereby allowing for a more compact design. As well as providing a fuel cell in a vehicle in order to replace the internal combustion engine that would in turn provide a vehicle that operates using clean energy and reducing pollutants released to the atmosphere.

Claims 38 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over McLean in view of U.S. Pre-Grant Publication No. 2001/0041281 hereinafter Wilkinson.



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McLean teaches everything in the above 102 rejection.

McLean does not explicitly teach that the serpentine pattern is either in phase or out of phase.

Wilkinson teaches a proton exchange membrane fuel cell for an automobile comprising membrane electrode assemblies which have two field flow plates having a plurality of channels wherein the channels are designed to be varied in shape and pattern, where the channels can be different sizes, and cross sectional areas that have the same specific dimensions as those claimed in the present application as well as having a sinusoidal shape that can be in phase or out of phase (abstract, figures 2d and 2e, paragraphs [0003], [0007], [0015], [0016], [0028]-[0030], [0035], [0036], [0041], and claims 6, 7 and 11). The Examiner notes that due to the absence of any clear definition in applicants' disclosure of "in phase" or "out of phase" and also the absence of any drawing illustrating the two the Examiner construes figure 2d of the Wilkinson reference to be "in phase" and figure 2e to be "out of phase".

At the time of the invention it would have been obvious to a person having ordinary skill in the art to include the teaching of the Wilkinson reference in the McLean reference in order to provide varying serpentine patterns that would provide varying surface contacts that would thereby increase the efficiency of the fuel cell system.

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert Hodge whose telephone number is (571) 272-2097. The examiner can normally be reached on 8:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Trainer Susy Tsang-Foster can be reached on (571) 272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RWH

  
SUSYTSANG-FOSTER  
PRIMARY EXAMINER